# Chapter 9

# Cross Sections & Labeling

## 9.1 Objectives

- Create cross sections along a previously designed corridor.
- Annotate proposed cross sections.

## 9.2 Cross Sections Overview

Corridor Modeling Cross Section commands extract, display, annotate, and update cross sections. These commands also allow you to export data from cross sections to a surface.

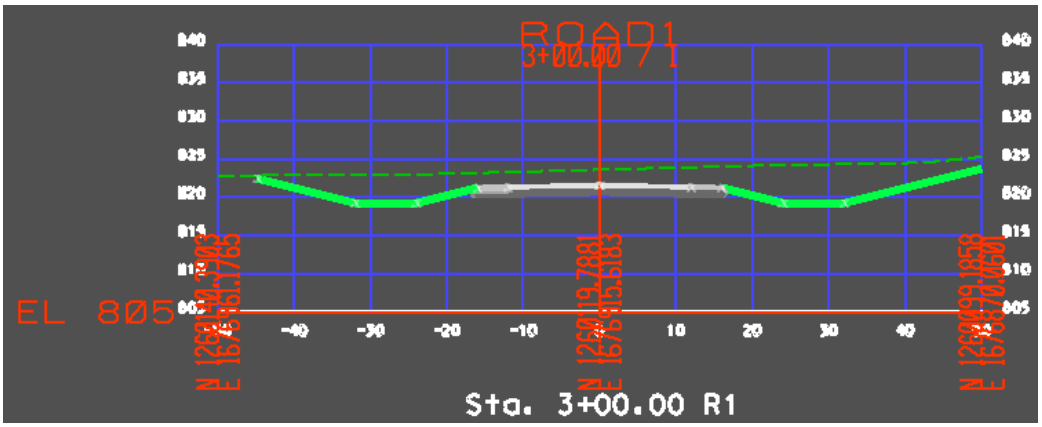
A cross section is a two-dimensional window of graphics representing a planar section of a three-dimensional (3-D) model. Typically, the 3-D objects displayed in cross section are terrain models and objects such as the existing terrain or a proposed road. The graphics showing a terrain model in a cross section is a cross section surface.

Cross sections are extracted across a horizontal alignment or some other linear feature. (Cross sections can be extracted at a skewed angle, but they are typically perpendicular to the alignment). The width of the cross section window is defined relative to the linear feature. For example, you might want your cross sections to span the range from 50 feet left of the alignment to 50 feet right of the alignment. The height of the cross section represents a range of elevation, for example from 380 to 400 feet.

When you create one or more cross sections, you choose which surfaces to display. Each cross section displays the selected surfaces as they pass through the window. Each surface is represented in the cross section by a data line known as a cross section surface.

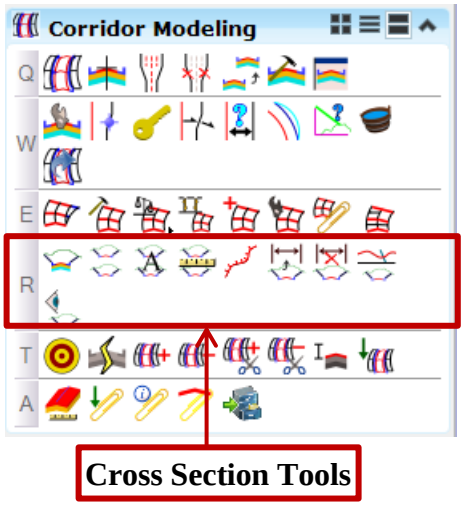
Cross sections serve several purposes during a project. They allow you to examine your model in detail. For example, you can verify that a ditch you have designed is being placed properly or that your roadway side slope is at the correct grade. You can annotate the points and lines in cross sections by slope as well as offset and elevation.

Other important uses for cross sections are computing cut and fill volumes.



## 9.3 Create Cross Sections

Extracts multiple cross sections and draws them in a matrix pattern. These sections are subsequently used for cross section sheets and earthwork calculations. Only the surfaces that you select when you initiate the command are displayed in the cross sections.




Typically, you use this command to extract cross sections along the active horizontal alignment; however, this command can generate cross sections along graphic elements.

Features are projected based on *Feature Definition Settings*.

**Symbology**

The **Create Cross Sections** command determines the surface symbology from a terrain model or an object. This gives predictable symbology results since the terrain model is driving the symbology.

The cross section creation application requires the selection of an alignment in which the user desires to cut cross sections along. In any given design, the user has the option to create all of their planimetrics and alignments in a 2D model or a 3D model. If the user decides to work in 2D, then a 3D model will be automatically created in the background for the user and maintained by the product as design changes are made. In this scenario, the user should reference in the 2D model because that is where the alignment is stored.

A 2D model is used for design as suggested as a "Best Practice". When cross sections are created, the application "slices" the 3D model to determine the components to display on the cross section. It is required to reference in the proposed alignment. If that alignment is in the 2D model, then simply referencing that model is not sufficient. In our 2D design model, we have referenced in automatically the 3D model once vertical geometry is created. For the **Create Cross Section** application to have access to this 3D model, it must be referenced to the cross section drawing as well. The most efficient way to accomplish this and make sure no references are missed.

Finally, once the design model is attached, the user should at this time set each level display to the desired preference. The create cross section application works on a WYSIWYG premises. ***For example*:** suppose in your design, a guardrail was placed in your 3D model. However, it was not desired to see this guardrail on your proposed cross sections. By simply turning this level off and saving your settings, when cross sections are created, this level will not be displayed. The level settings need to be made at the 3D model level. Once each level setting is verified, make sure to **Save Settings** in the DGN file for those preferences to be remembered.

The **Create Cross Section** application acts as a "cookie cutter" based on a WYSIWYG functionality. The Create Cross Section application slices through the 3D design model at specified even intervals or customized cross section locations. It is important that a template drop location exists in the design corridor at each station location where proposed cross sections are intended to be generated. We do this to avoid interpolation between template drop locations. For

example, if a design called for a template drop every 20 feet but the user wanted to create cross sections at a 10 foot interval, every other section would be interpolated and risks a chance of the proposed finished grade and existing ground not precisely connecting. In the MoDOT workspace, several design stages exist that may be assigned to any Corridor, which will directly affect the template drop interval multiplier.

Corridor Design Stages directly affect the interval of template drops. When creating a Corridor, one of the prompts will ask the user for the Template Drop Interval. The user should always key in the desired final interval. Then, based on the selected Corridor Design Stage selected, the template drop interval will be increased by the design stage template drop interval multiplier. ***For example***, the template drop interval multiplier for the Preliminary Design Stage is 40. So if a user puts in a final template drop interval of 10 and then selects the Preliminary Design stage, the corridor design will contain a template drop every 400 feet or 10 x 40 = 400. This concept has been adopted to allow for very fast model processing in the Preliminary Design stage. Consequently, the multiplier for the Design Stage is set to 2, and the multiplier for the Final Design Stage is set to 1. These settings are stored in a DGNLib for Project Settings in the included MoDOT_workspace. Each customer will likely want to review and modify these settings based on their individual workflows for in-house design work.

When cross sections are created, the application automatically creates a DGN Drawing Model and writes the cross sections to that Model. The user is granted the opportunity to name the Drawing Model before it gets created. By default, the name will correspond to the name of the alignment the cross sections are being developed along. It is acceptable practice to cut multiple sets of cross sections in the same DGN file. Each time cross sections are created, they will be drawn to a new and differently named DGN Drawing Model.

> Each DGN file contains one or more models, each of which has its own set of eight views. You can create a model as a 2D or 3D Design type, as a 2D Drawing type or as a 2D or 3D Sheet type. Sheet models let you attach references to create a set of working drawings for the model file. Icons at the top of the Models dialog give you access to its various functions.

Finally, the created proposed cross sections are not presently "dynamic". Thus, if the design model changes, the user would be required to re-create the cross sections. GEOPAK SS4 does contain a Dynamic Cross Section viewer, which does dynamically update as the model undergoes continued design updates. Before re-creating the proposed cross sections, the user may choose to delete the previously created DGN Drawing Model. If the user intends to create an output of cross sections, such as, creating cross section sheets, legacy tools must be used.
GEOPAK>ROAD>Cross Sections.

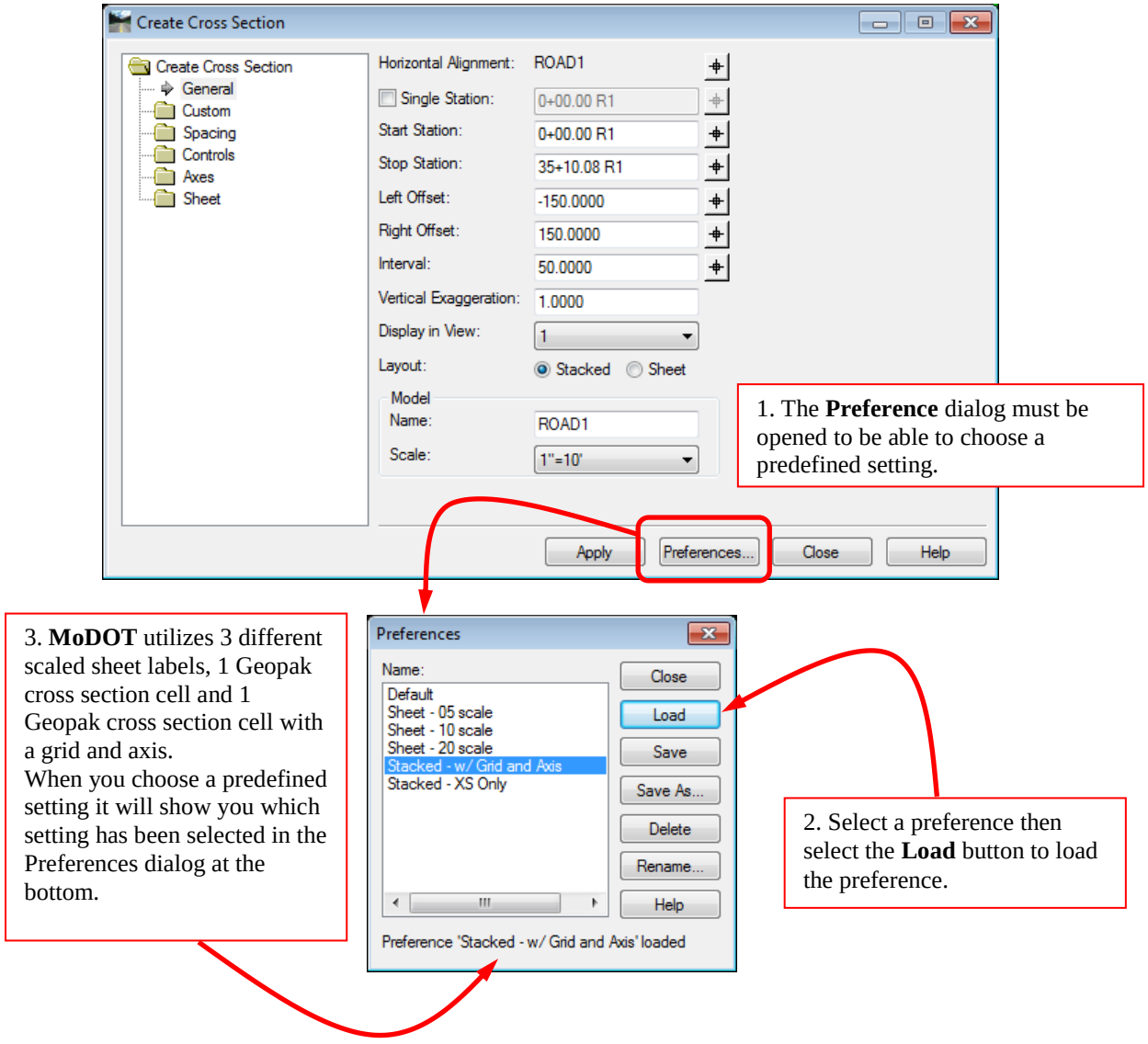
## Cross Section Workflow

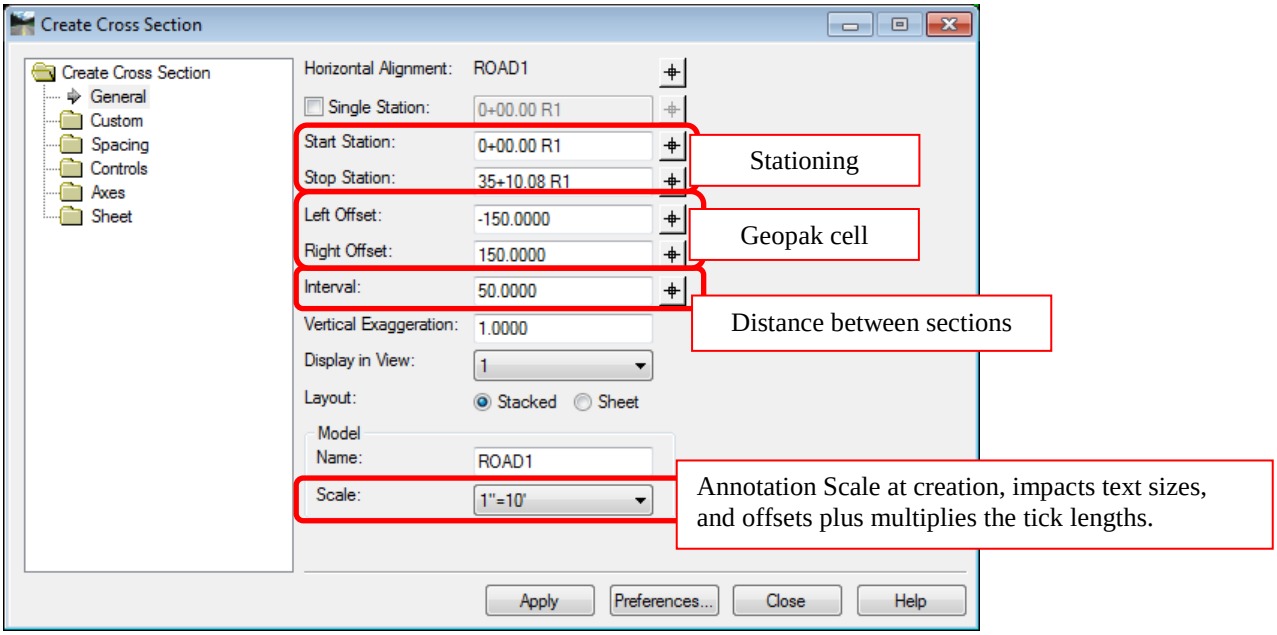
1. Create a new cross section DGN file.
2. Reference in the proposed design to the cross section DGN file.
3. Setting the appropriate levels on or off for cross section display preferences.
4. Create the proposed cross sections from the 3D design model.

5. Navigate the proposed cross sections.
6. Annotate the proposed cross sections.
7. Compute end-area volumes of the proposed cross sections.

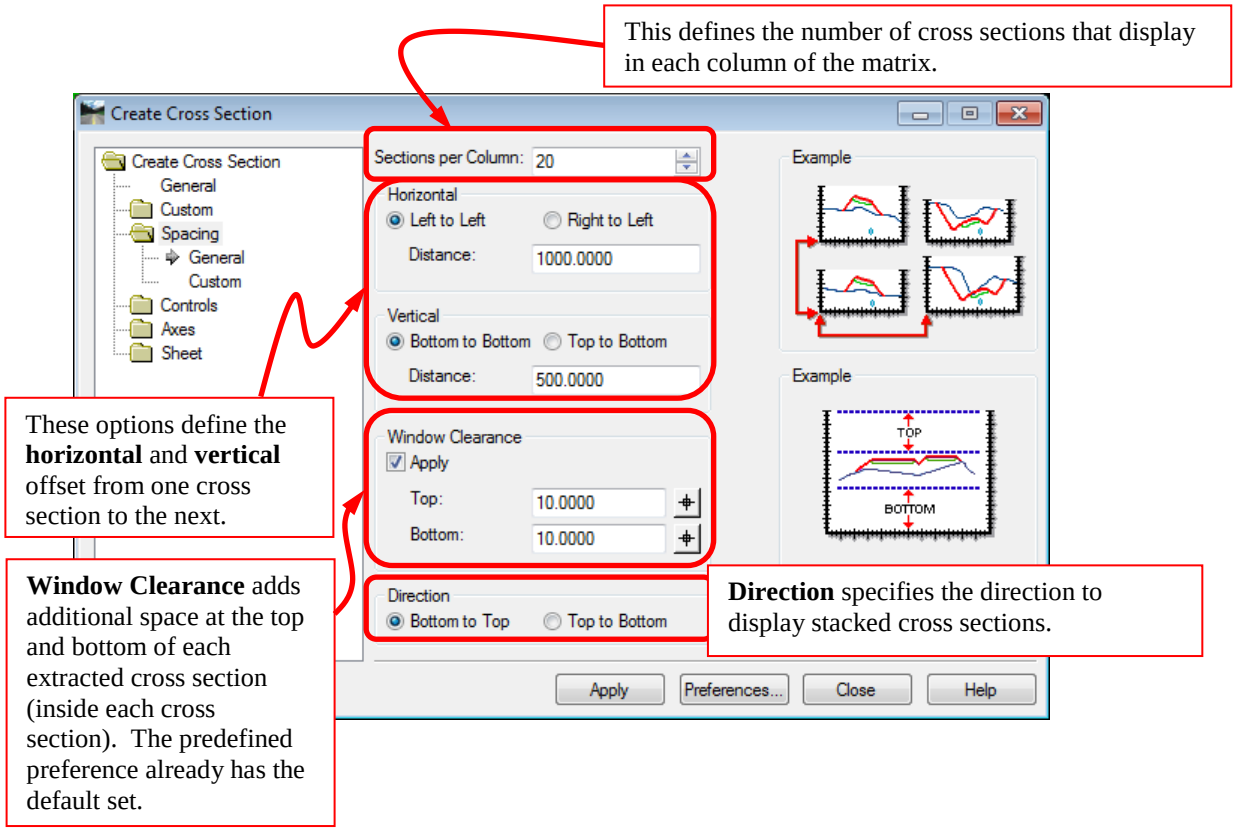
## 9.4 **Create Cross Sections Dialog**

### General Leaf



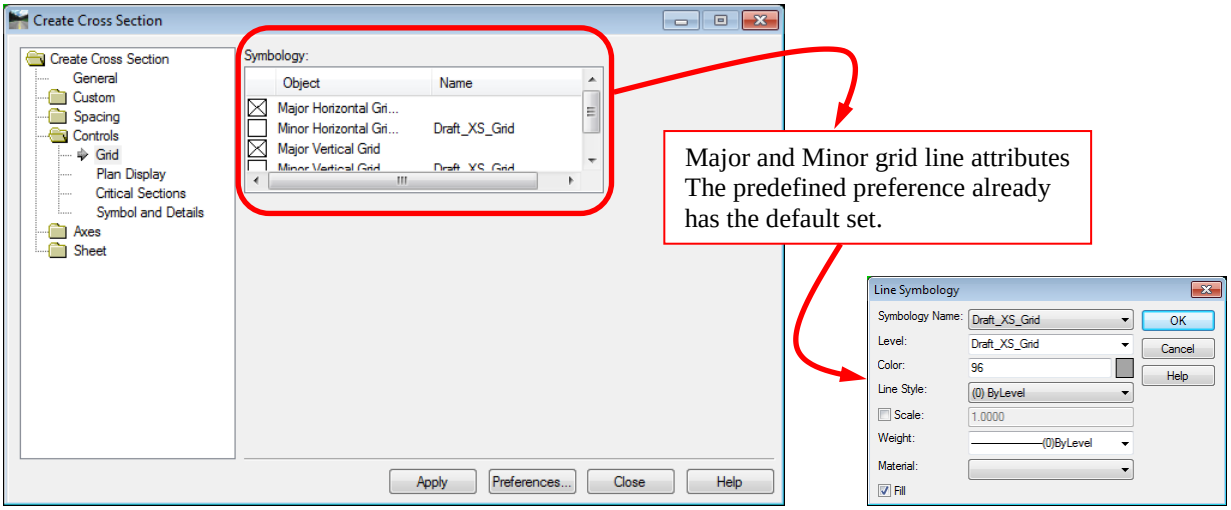



**Spacing Leaf** - Use this dialog to define the settings for stacked or sheet modes.

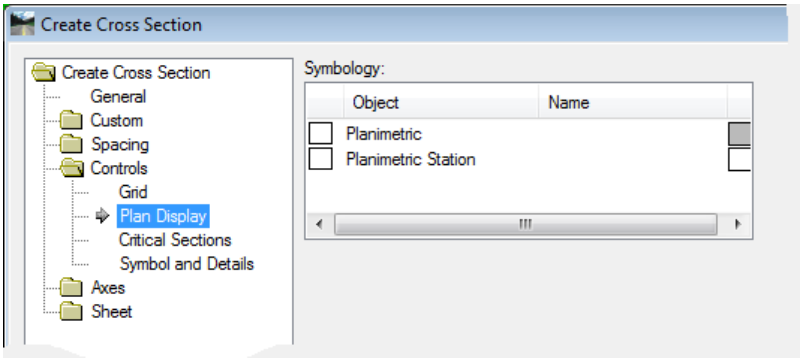


### Controls Leaf

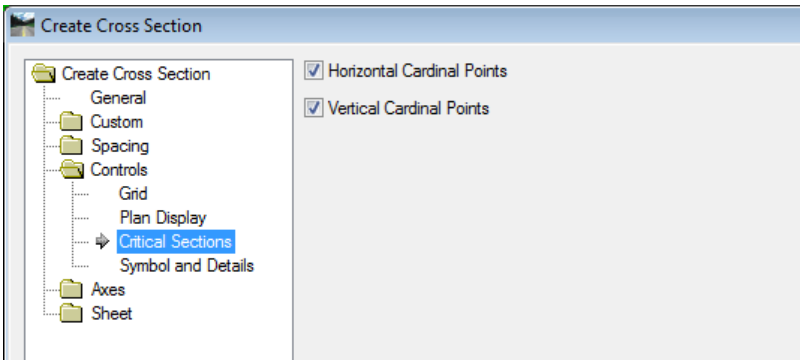
**Grid -** Use this dialog to control the display of grid lines in the cross section. You can display grid lines to correspond to major or minor ticks marks (which are defined on the Axes General leafs), and you can optionally clip horizontal and vertical grid lines so that they display only within the bounds of the cross-section surface data.




**Plan Display** – If checked on, this option will create elements and/or labels in the Plan.DGN.



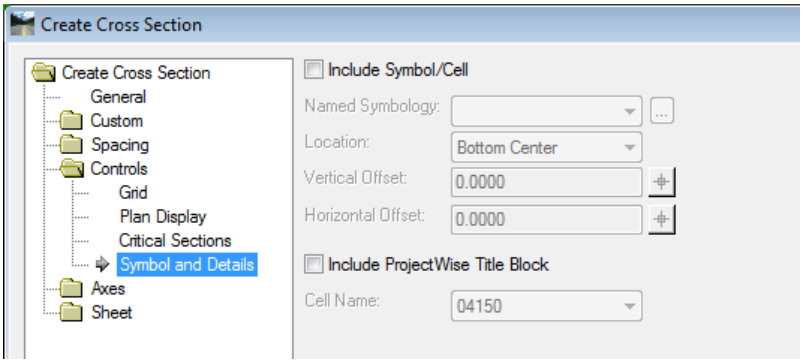

**Critical Sections –** Use this dialog to control the occurrence of critical sections in cross sections.



**Horizontal Cardinal Points -** extracts cross sections at the cardinal points of the horizontal alignment specified on the General leaf (PC, PT, and so forth).

**Vertical Cardinal Points -** extracts cross sections at the cardinal points of the active vertical alignment corresponding to the horizontal alignment specified on the General leaf.

**Symbols and Details** – This option is not used within the MoDOT default set up.




## Axes Leaf - General

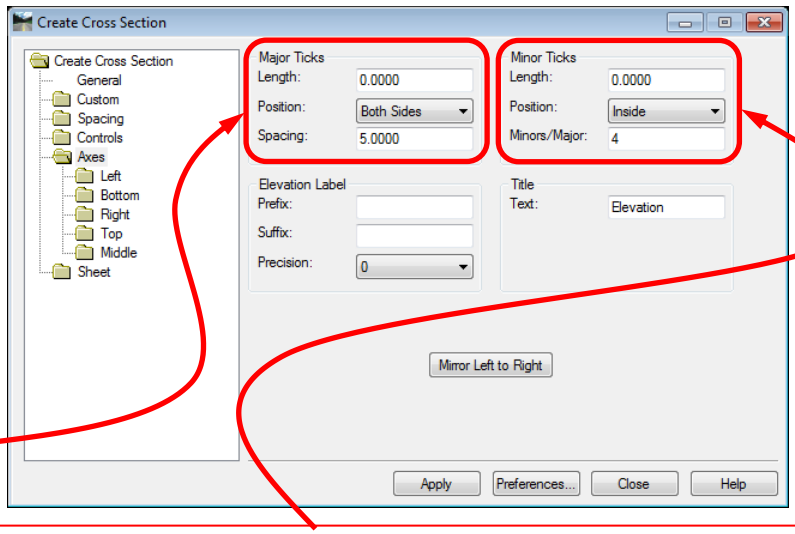
Use this dialog to control which parts of each cross section axis to display and in what format. For each axis, you can display a number of features, including the axis line itself, a title text string and title box (next to the axis), annotation text for the data associated with the axis, and the major and minor ticks that are displayed along the axis.

**Major Ticks**

**Length** - defines the length of major tick marks. If the length is zero, the tick length will be one half of the label text height.

**Position** - places major tick marks inside, outside, or on both sides of each axis.

**Spacing** - specifies the distance between major ticks along the axis. For top and bottom cross section axes, a major tick is always placed at the axis endpoints, regardless of the stationing values at those points, while for top and bottom cross section axes, a major tick is always placed first at the centerline point. This parameter determines how to place all subsequent major tick marks along the axis.

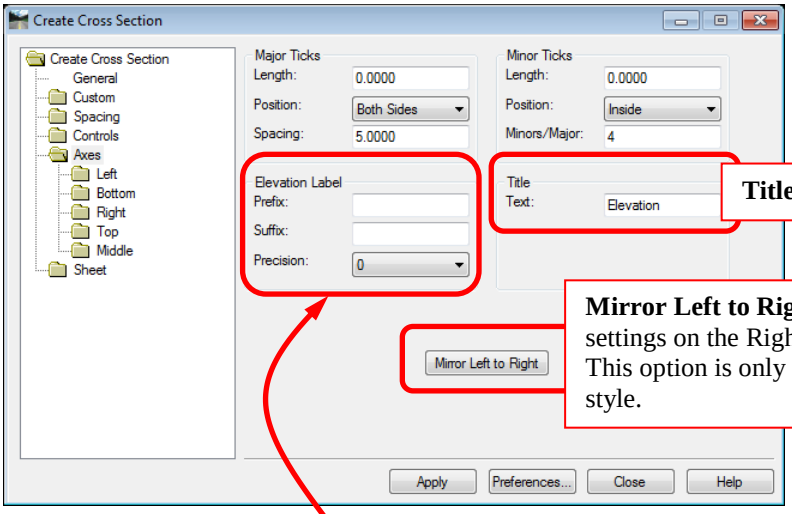



**Minor Ticks**

**Length** - defines the length of minor tick marks. If the length is zero, the tick length will be one half of the label text height.

**Position** - places minor tick marks inside, outside, or on both sides of the axis.

**Minors/Major** - specifies the number of minor tick marks to display between




**Title Text** - specifies text for individual axis.

**Mirror Left to Right** - displays the identical settings on the Right axis.
This option is only available if the label uses a text style.

**Elevation Label** - defines a text string for each axis other than the bottom axis. The stationing value serves as the title for the bottom axis.

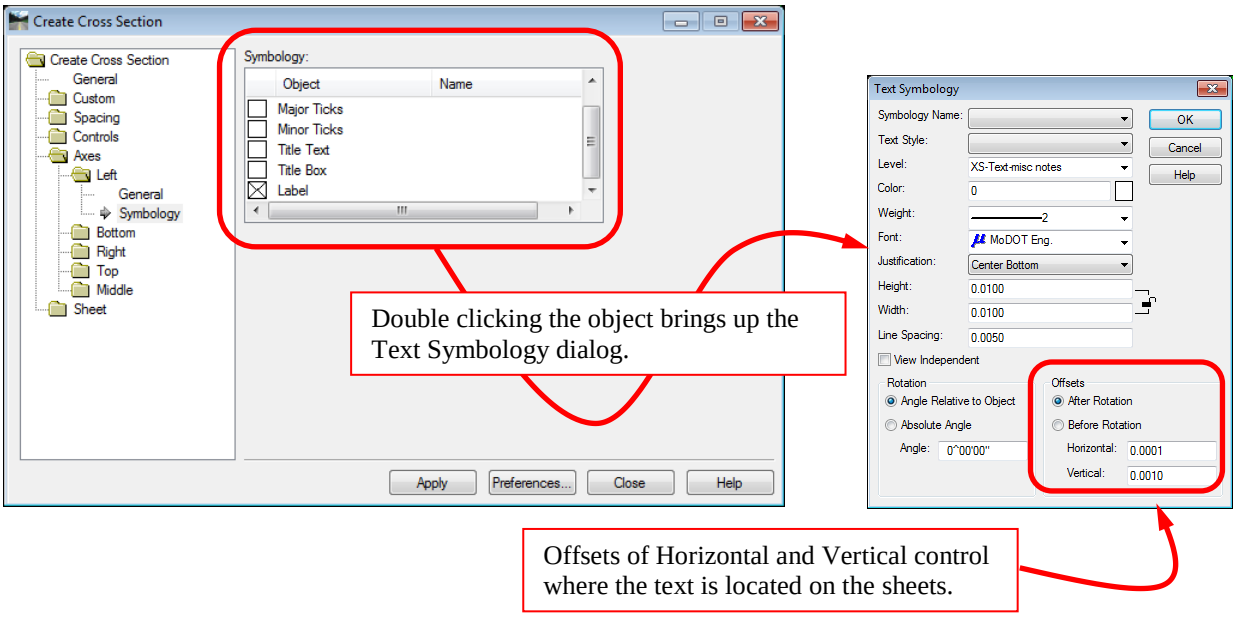
**Prefix** - specifies a text string to place at the beginning of the axis annotation text.

**Suffix** - specifies a text string to append to the axis annotation text.

**Precision** - specifies the number of digits to follow the decimal point in the axis annotation text.

## Axes Leaf – Symbology

Use this dialog to specify the symbology settings for the Axes. These settings have been set up to MoDOT's standards once the preference has been selected.




Double clicking the object brings up the Text Symbology dialog.

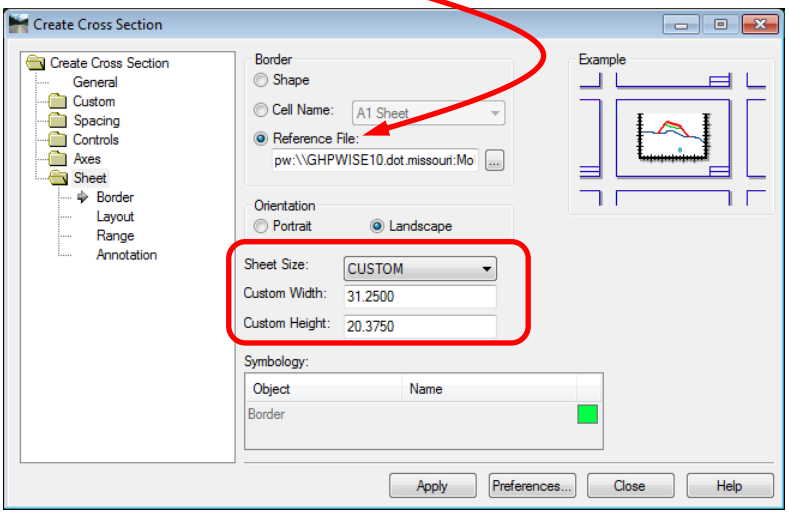
Offsets of Horizontal and Vertical control where the text is located on the sheets.

## Sheet Leaf

### Border

pw:\\GHPWISE10.dot.missouri:MoDOT\Documents\CADD_Standards\Borders\MoDOT_DE_2008.dgn

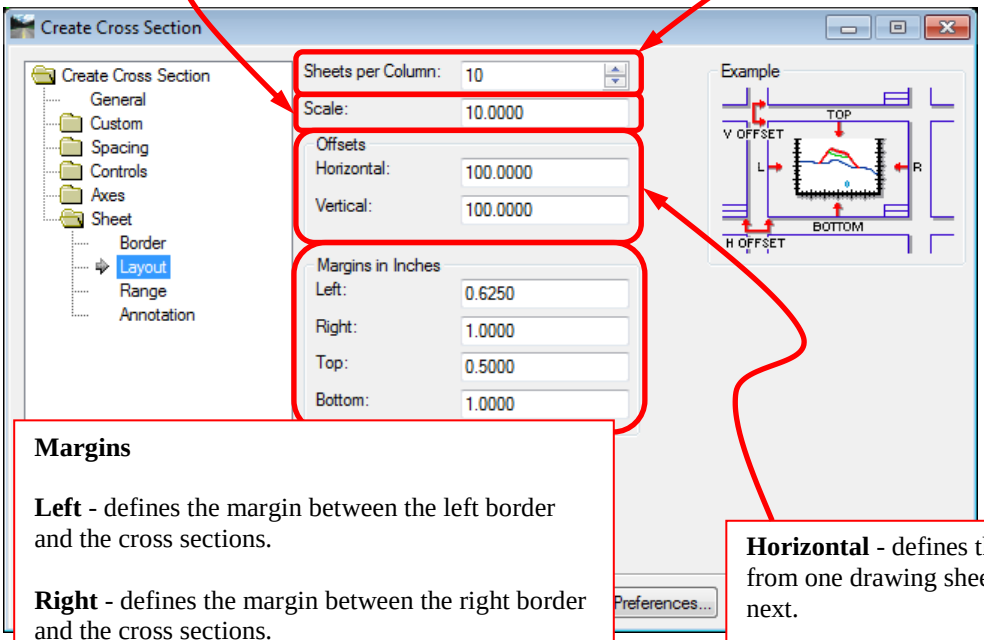
MoDOT's border file located in ProjectWise is attached with using the "read only" option checked on.




### Layout

**Scale** - defines the size exaggeration for the cross section.

**Sheets per Column** - defines the number of sheets per column for stacking sheets. If 1 is selected, sheets are placed horizontally and if a number greater than the number of sheets produced is selected for sheets per column, sheets are placed vertically. This gives you the ability to create sheets in a grid display instead of a long row or column for plotting.




**Margins**

**Left** - defines the margin between the left border and the cross sections.

**Right** - defines the margin between the right border and the cross sections.

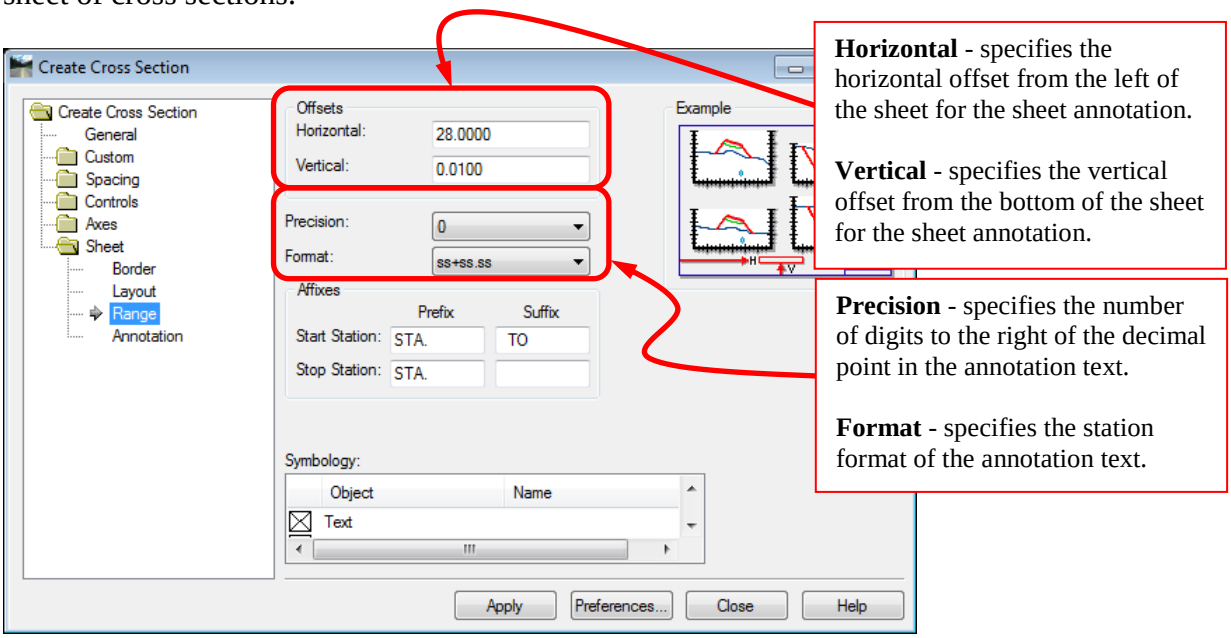
**Top** - defines the margin between the top border and the cross sections.

**Bottom** - defines the margin between the bottom border and the cross sections.

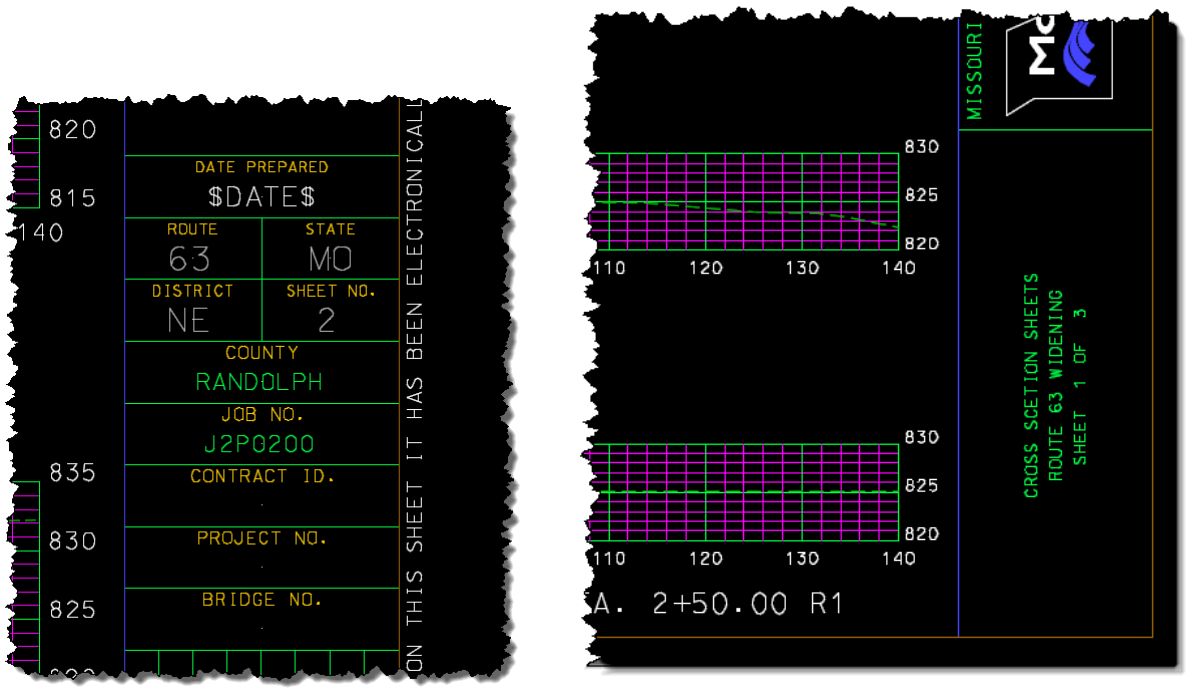
**Horizontal** - defines the horizontal offset from one drawing sheet outline to the next.

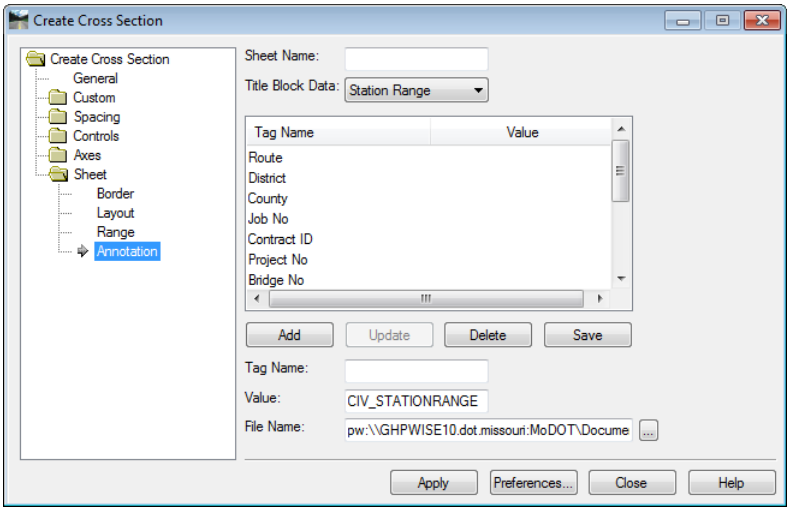
**Vertical** - defines the vertical offset from one drawing sheet outline to the next.

**Range** - Use this dialog to specify the settings for displaying station range annotation on each sheet of cross sections.

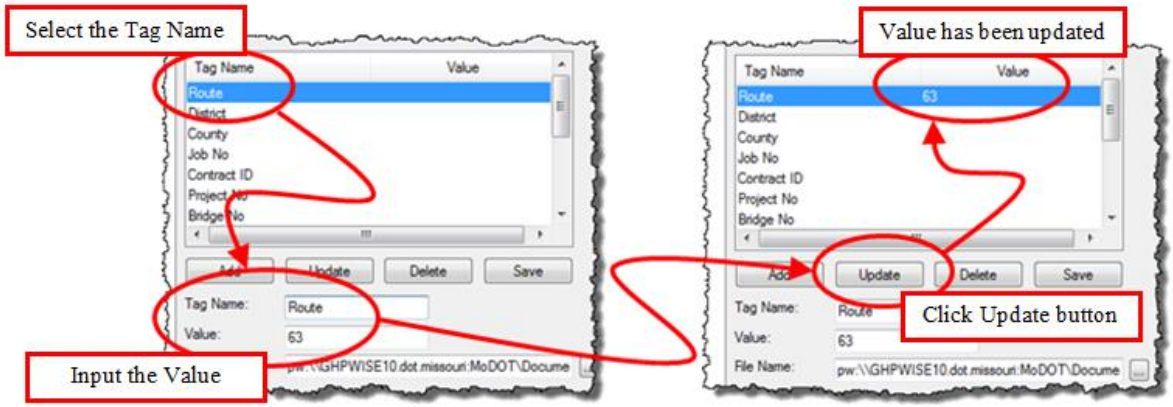



**Annotation** - Use this dialog to define settings for title block annotation that is automatically generated on cross section sheets. You can also define unique fields for annotation, such as project name, and so on. This feature is available only when borders are attached as reference files, and the tags are in the referenced border



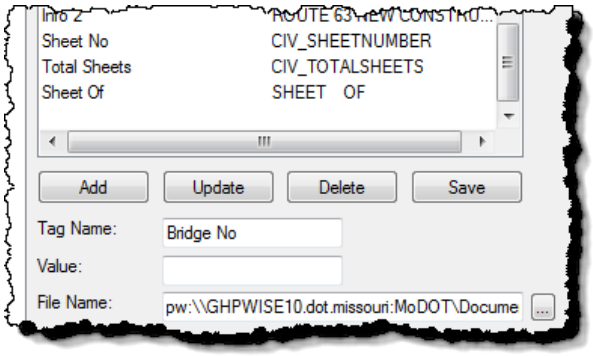



The Tag values will need to be filled out the title block information.
Select a Tag Name and enter a value then select the "Update" button to apply the changes to the tool settings.



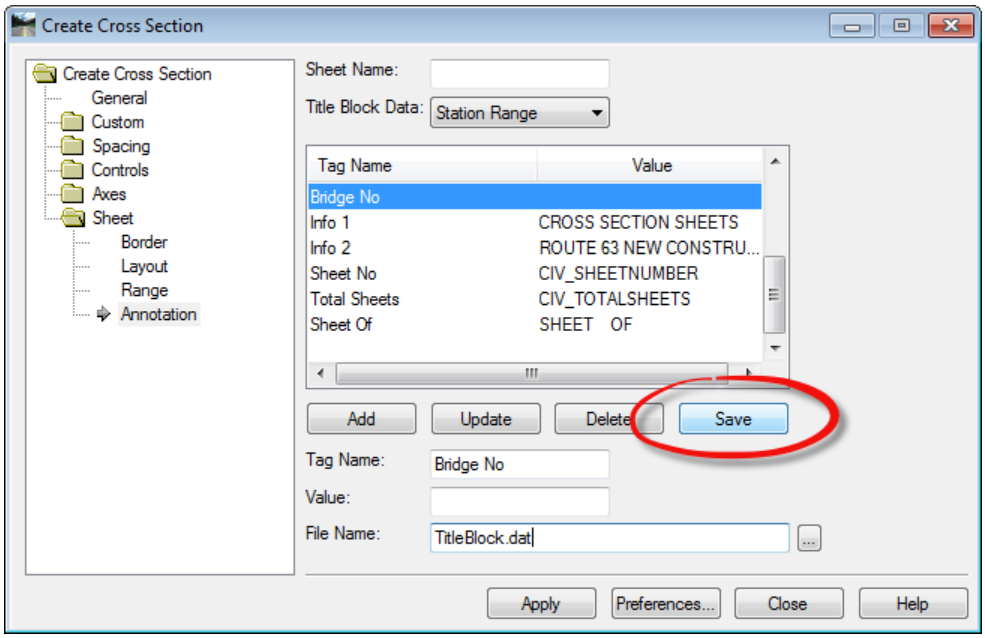

**Note – If a field is left blank then it will not place any text where the Tag location was defined.

The last 3 Tags will be predefined with the value needed to compute the sheet number and total sheets along with the verbiage "SHEET OF."



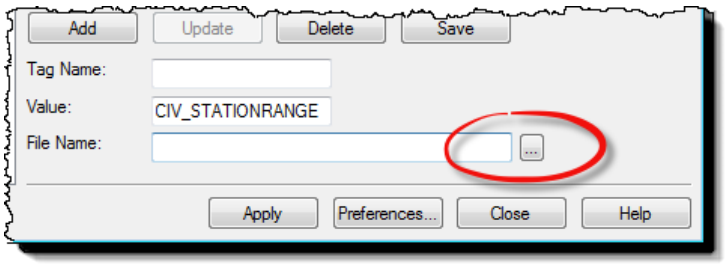
After the Tag values are completed the user can save a DAT file which saves the dialog information so that the values can be easily recalled and used again.

The attached DAT file will be the default MoDOT.DAT file that resides on the T:\MoDOT_Workspace\Modeling\Cross Sections and cannot be overwritten so you will need to save a copy to your Job > Data folder.




Once the file is saved your data folder the tool will revert back to that location when opening the tool the next time.

The pick button allows the user to load the MoDOT default DAT file by navigating to the T:\MoDOT_Workspace\Modeling\Cross Sections folder and selecting the MoDOT.DAT file.




Once the cross sections have been defined, the information has been defined in the dialog and the DAT file saved to the data folder the tool is ready to use.

Click on the Apply button to create the cross section model. The border will be referenced into the model with instances created for each sheet that is created.

The title block information will be filled out according to your settings and the informational block will be created in the lower right, vertically with the defined settings that were defined in the dialog.

***Note** – The Make PDF Request can only handle 50 borders at one time so it is recommended that you run all the cross sections in one model and then save as a copy (some may have 3 files for cross sections) from the original.

Open the model containing the cross sections and remove the extra cross sections leaving the cross sections needed for the Make PDF Request tool.

## 9.5 Annotate Cross Sections

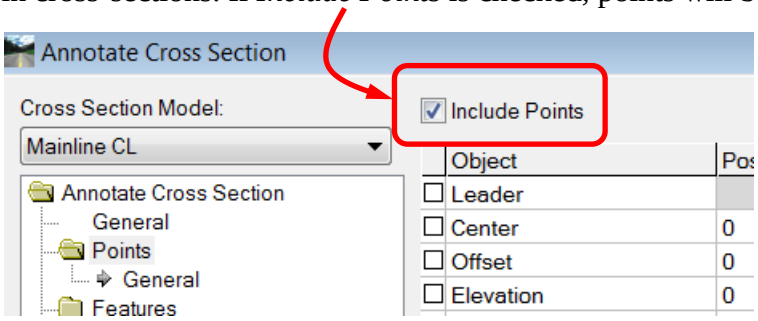
Annotate Cross Sections places text describing the characteristics of cross sections that were previously placed in the drawing file. These characteristics can include slope, width, elevation, and offsets. The cross sections may have been placed with any of the cross-section extraction and display options. Annotation allows you to know the characteristics of your design as you examine cross sections.

Annotation for features obeys the design file annotation scale factor.

**Which Elements Are Annotated?**

The following controls what annotation appears in the cross section:

The ***Points, Features, and Segments*** leafs are used as master switches to turn on or off annotation for points, segments, or features. For example, if *Include Points* is not checked, no point annotation appears in cross sections. If *Include Points* is checked, points will be annotated.

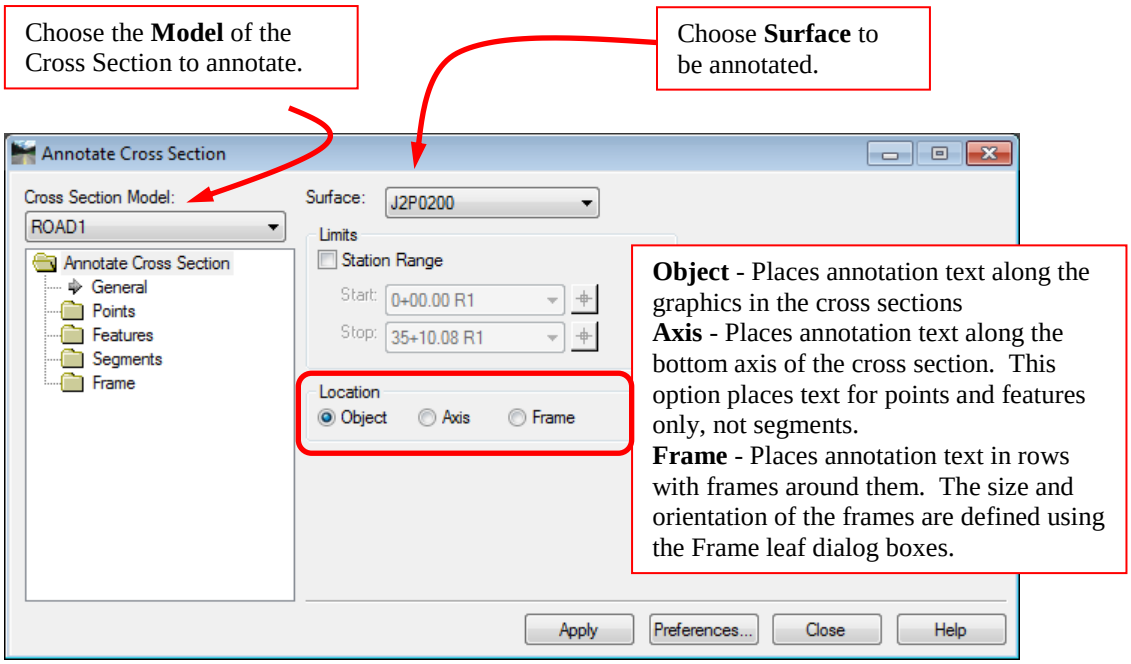



The parameters on the *Points, Features, Segments, and Frame* leafs restrict which elements are annotated.

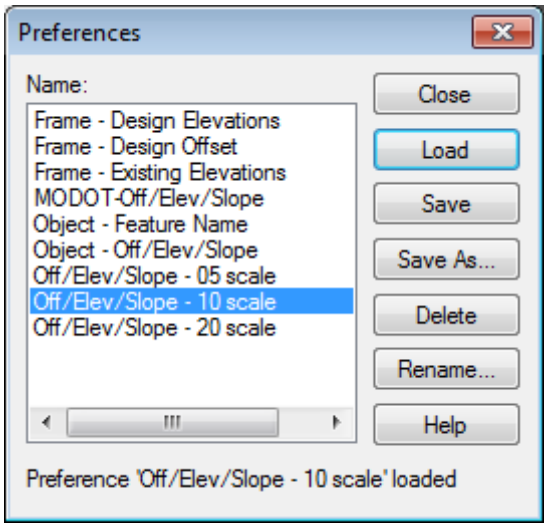
The Annotate Cross Section command can annotate multiple surfaces in a single pass. On the General dialog is a list view, which lists each surface in the cross section set and a preference. The preference listed is either the active preference for the command or the preference defined in *Surface Properties* for that surface, depending on style lock. This list view allows you to select multiple surfaces to annotate.

The Annotate Cross Section application has the ability to label any particular cross section model present in the active DGN file including models that are not active. In addition, we have the

ability to label any surface found within all models of our DGN file. The annotation application is highly versatile to meet many different types of labeling needs. For example, the cross section annotation application can label the individual objects along the cross section, along a bottom axis, or in a frame mode. It is possible to label points along a surface, crossing linear features, and component segments like the slopes of a proposed pavement for example. The supported combinations are endless regarding all that can be labeled along a cross section.



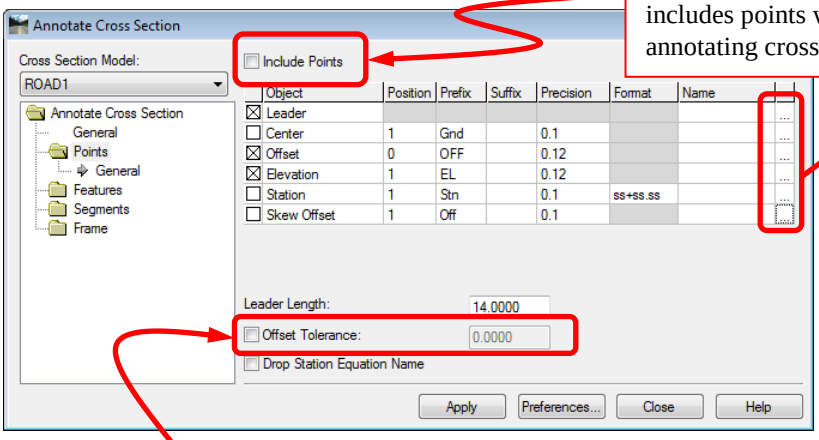

Preferences are stored in the MoDOT workspace in a XIN file. Several preferences are provided in the MoDOT workspace. The scales of 5, 10 and 20 support the cross section settings in the MoDOT create cross section tool.

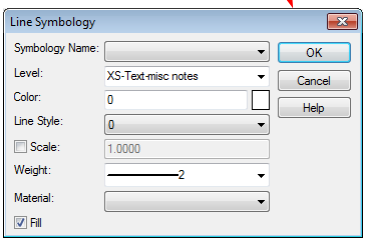


**Points** – Used to label points on cross sections.

**Include Points** - If checked, includes points when annotating cross sections.

The last column in the grid is the means of access to the symbology dialog.

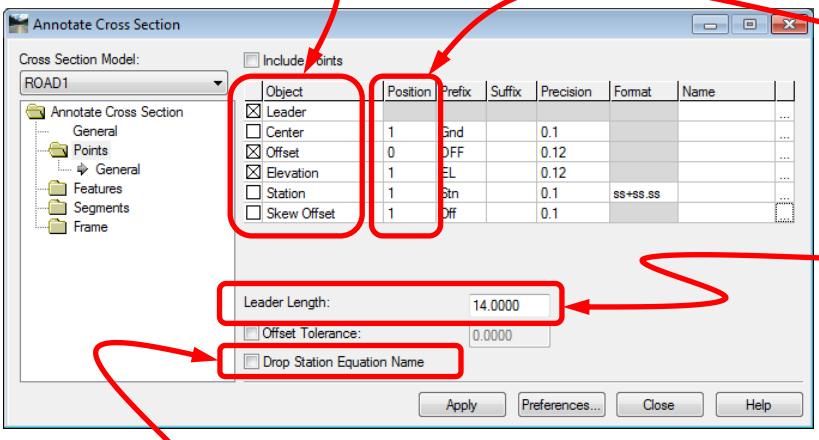



**Offset Tolerance** - if checked, will not annotate points within the defined tolerance. This applies to points coming from the surface line or from the ASCII file.

**Object** - displays object attributes in rows. The first column has check boxes indicating which attributes are to be included in the annotation.
**Leader** - leader line for the annotation to follow.
**Center** - annotation of the centerline (zero offset) of the cross section.
**Offset** - annotation of the offset of any point in the cross section.
**Elevation** - annotation of the elevation of any point in the cross section.
**Station** - the station of the feature relative to the alignment.
**Skew Offset** - annotation of the offset of each point in the cross section. The offset is measured along the cross section (not by normal projection).

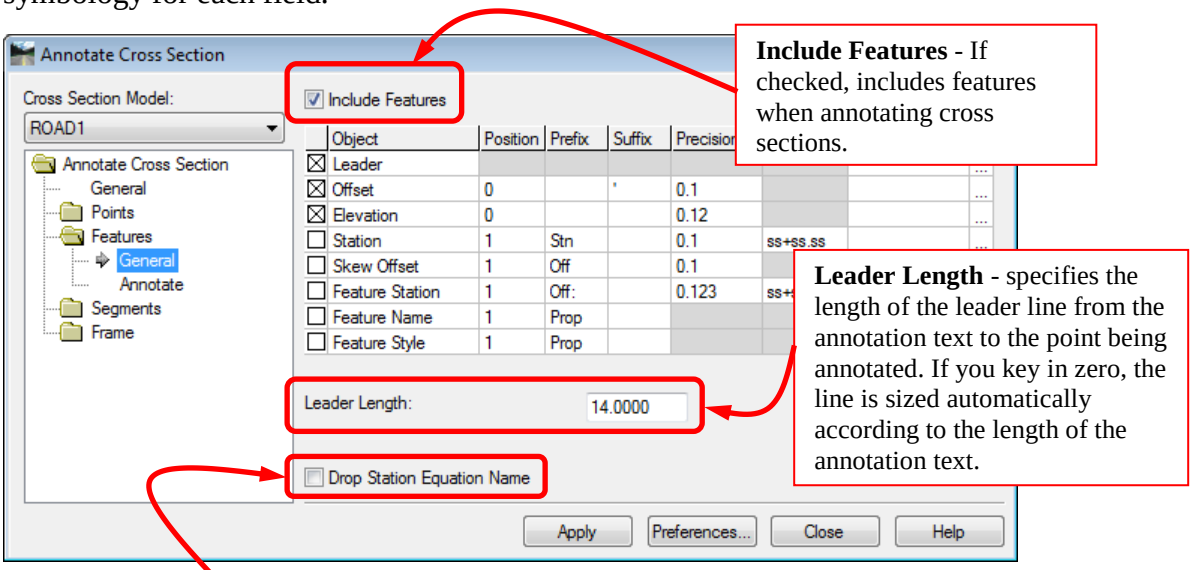
**Position** - controls the position of the annotation text. A value of zero does not affect the text position. A value of 1 moves the text so that it displays one line above its original position. A value of 2 moves the text two lines above its original position, and so forth. Negative values move the text in the opposite direction.




**Leader Length** - specifies the length of the leader line from the annotation text to the point being annotated. If you key in zero, the line is sized automatically according to the length of the annotation text.

**Drop Station Equation Name** - if checked, drops the station equation name. If an equation name exists at the station, it is not formatted as part of the station. For example, station "a10+00" is formatted as "10+00.00" when this option is toggled on. When this option is toggled off, station "a10+00" is formatted as "a10+00.00".

**Features** - This dialog box is designed to use the grid control. As on the Points and Segments dialogs the fields for position, prefix, suffix and precision are combined into one control with the symbology for each field.



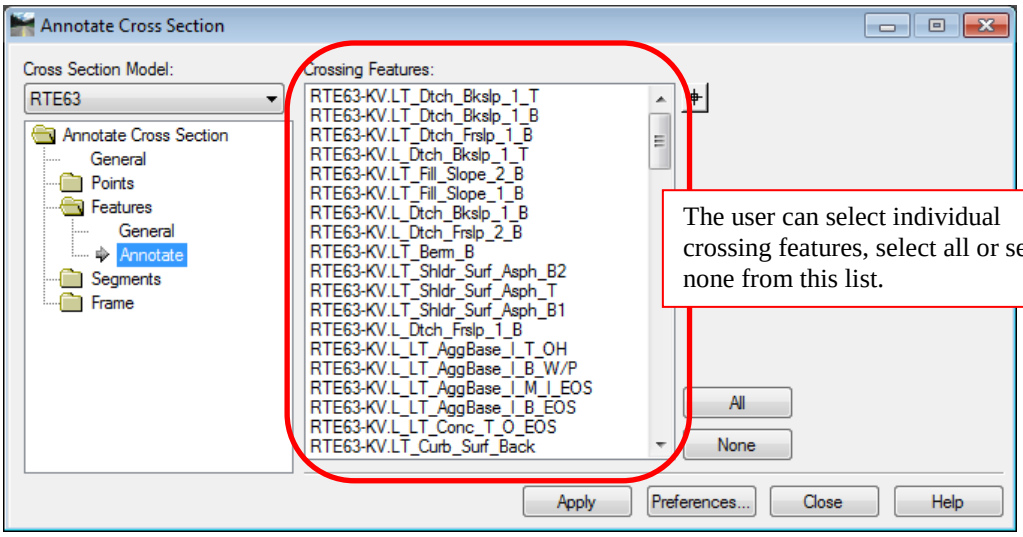

**Include Features** - If checked, includes features when annotating cross sections.

**Leader Length** - specifies the length of the leader line from the annotation text to the point being annotated. If you key in zero, the line is sized automatically according to the length of the annotation text.

**Drop Station Equation Name** - if checked, drops the station equation name. If an equation name exists at the station, it is not formatted as part of the station. For example, station "a10+00" is formatted as "10+00.00" when this option is toggled on. When this option is toggled off, station "a10+00" is formatted as "a10+00.00".

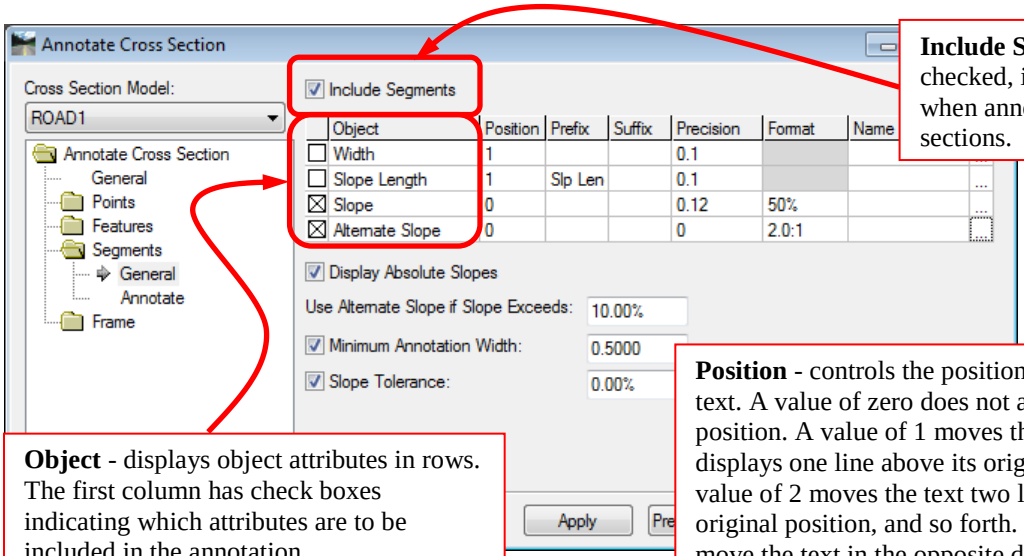
The following controls what annotation appears in the cross section:

The Points, Features, and Segments leafs are used as master switches to turn on or off annotation for points, segments, or features. For example, if the Include Points is not checked, no point annotation appears in cross sections.




The user can select individual crossing features, select all or select none from this list.

**Segments** - The Segments General leaf is designed to use the grid control. As on the Points dialog, the fields for position, prefix, suffix, precision, and format are combined into one control with the symbology for each field. The appropriate tolerances are added to the Segments dialog.




**Include Segments** - If checked, includes segments when annotating cross sections.

**Object** - displays object attributes in rows. The first column has check boxes indicating which attributes are to be included in the annotation.

**Width** - annotation of the width of any segment in the cross section.

**Slope Length** - annotation of the slope length of segments in the cross section.

**Slope** - annotation of the slope of segments in the cross section.

**Alternate Slope** - annotation of the slope of certain segments in the cross section, depending on whether or not **Use Alternative Slope if Slope Exceeds** has a specified value.

**Position** - controls the position of the annotation text. A value of zero does not affect the text position. A value of 1 moves the text so that it displays one line above its original position. A value of 2 moves the text two lines above its original position, and so forth. Negative values move the text in the opposite direction.

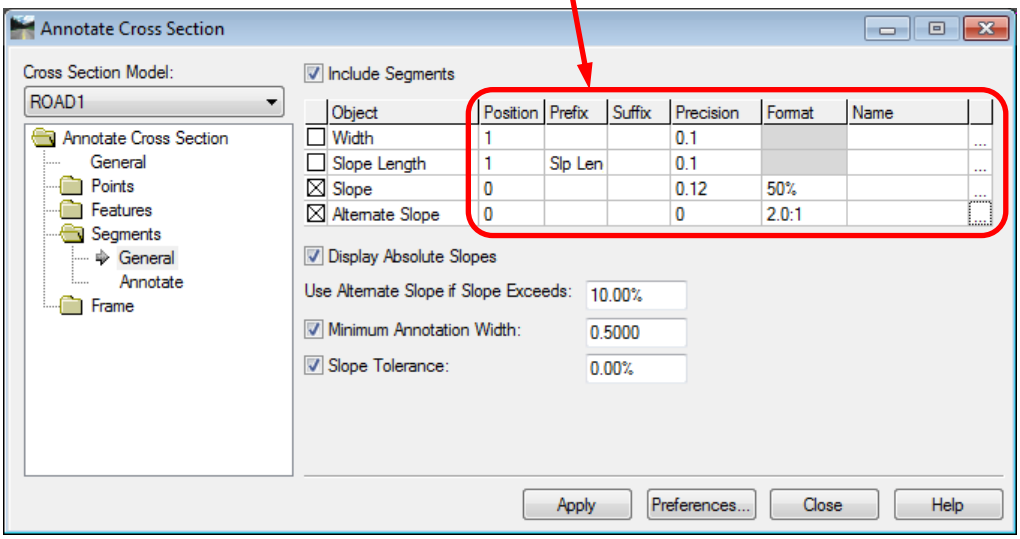
**Prefix** - specifies text to insert at the beginning of the annotation.

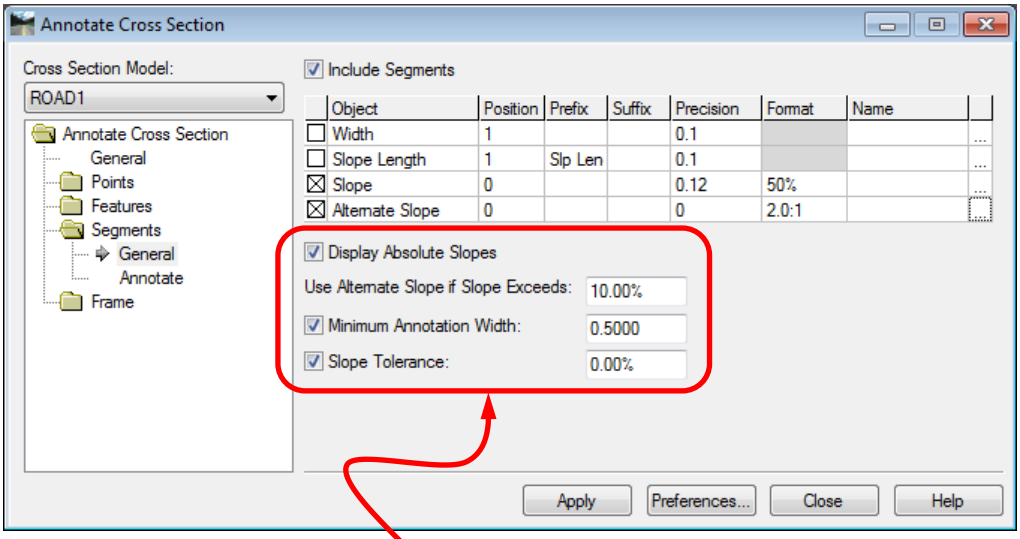
**Suffix** - specifies text to add at the end of the annotation.

**Precision** - controls the number of digits to the right of the decimal point in the annotation.

**Format** - specifies the format for the displayed annotation.

**Name** - specifies the named symbology for the specified object.






**Display Absolute Slopes** - if checked, displays the absolute values of slopes.

**Use Alternate Slope if Slope Exceeds** - allows a different set of parameters to control slope annotation depending on whether or not each slope of each segment is greater than or less than a specified value. This option allows you to annotate all segments whose slopes are less than 20%, for example, using one set of parameters, while using another set of parameters to annotate all segments whose slopes are greater than 20%. The two sets of parameters involved are those in the Slope column and those in the Alternate Slope column in the Display Controls group box. Specify any slope you want for the "r;slope exceeds" value.

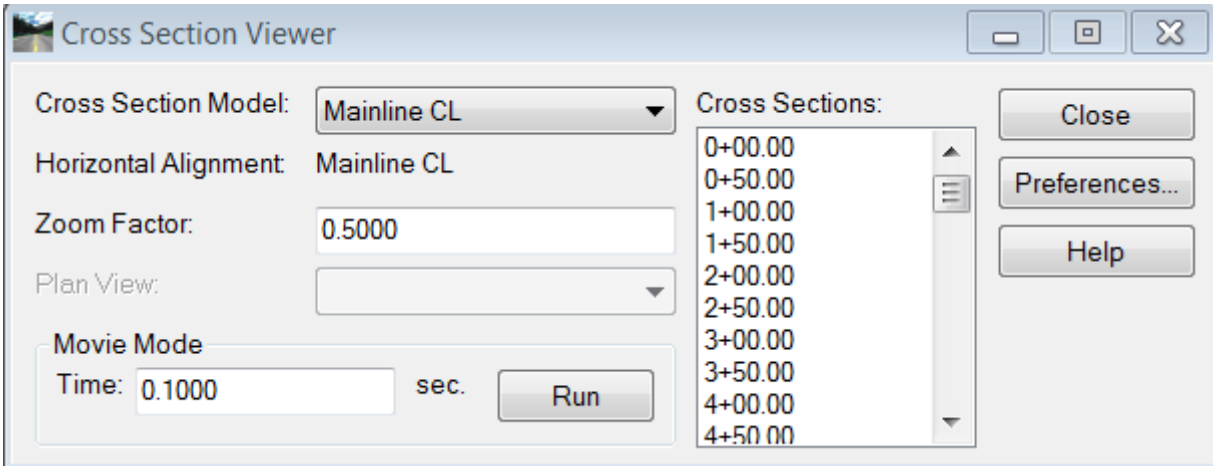
**Minimum Annotation Width** - if a segment's width is less than the defined value it will not be annotated.

**Slope Tolerance** - if checked, activates the slope tolerance check. If the difference in slope on adjacent segments is less than the slope tolerance only one slope value will be displayed.

Using MoDOT's default preferences will allow for quick and easy annotations.

## 9.6 Cross Section Viewer

The Cross Section Viewer command windows in on specified cross section set in the Model. Using the Cross Section Viewer, you can view a single cross section, or you can view in succession each cross section in a model. The latter method, called *Movie Mode*, displays each cross section for a specified time.




**Dialog Options**

**Cross Section Model** defines which set of cross sections to view. Select one of the available models.

**Horizontal Alignment** displays the horizontal alignment associated with the selected cross section.

**Zoom Factor** defines the zoom factor for adjusting the drawing file view. Enter a value greater than 1.0 to zoom out from the cross sections. Enter a value less than 1.0 to zoom in toward the cross sections. Only applies to the cross section view.

**Plan View** shows the plan location of the cross section viewed. Draws a temporary line in the plan view where the cross section is located and centers that line in the plan view.

**Movie Mode Time** specifies the time for viewing each cross section in the selected cross section set. You can enter time values in tenths of a second.

**Run** starts the movie mode of the cross section viewer. Selecting the <Esc> cancels the run

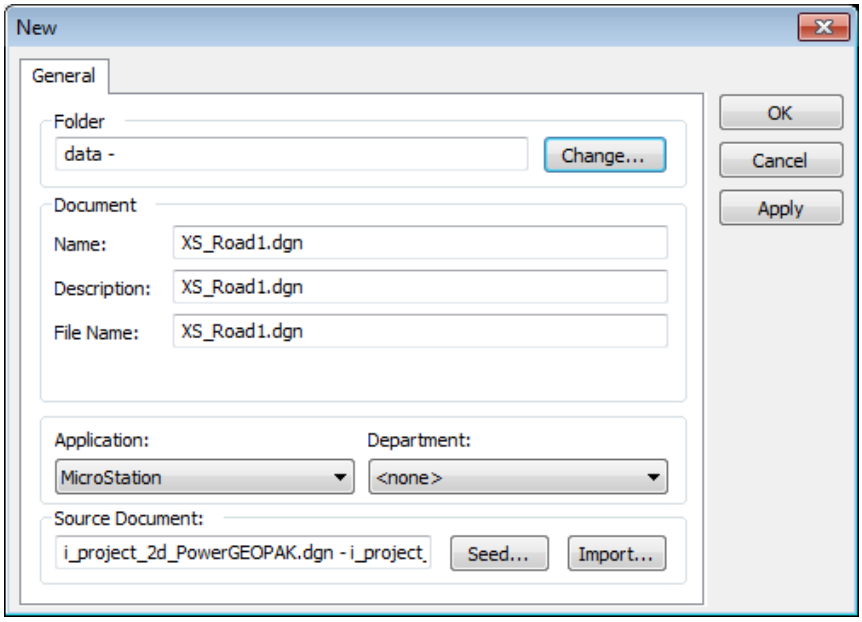
**Cross Sections** lists each cross section in the selected cross section set. Select a single cross section to immediately view it

## 9.7 Group Exercise: Cutting Road1 Cross Sections and Annotation

### Create a New Cross Section Design File

1. Within the J2P0200*data_09* folder, open the file: **Plan_J2P0200.dgn**
2. Select **File > New** and create a new MicroStation file named **XS_ J2P0200_Road1.dgn**

   Using the seed file: *pw:\CADD_Standards\Seed Files\Design - English**i_project_2d_PowerGEOPAK.dgn***




3. Select **OK** to create the new dgn file.

### Attaching the Design as a Reference File

4. In the file **XS_J2P0200_Road1.dgn** created above.
5. Choose **File** > **References** in the MicroStation pull down menu or use the MicroStation icon  .
6. In the *References* dialog menu choose **Tools** > **Attach**.
7. Select the files in your current working directory;

   ***Terrain_J2P0200_Existing.dgn***

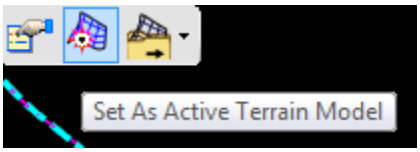
   ***Corridor_J2P0200.dgn***

   ***Land_Boundaries_J2P0200.dgn***

   ***Civil_Geometry_J2P0200.dgn***

   ***Superelevation_J2P0200 then*** click **OK**

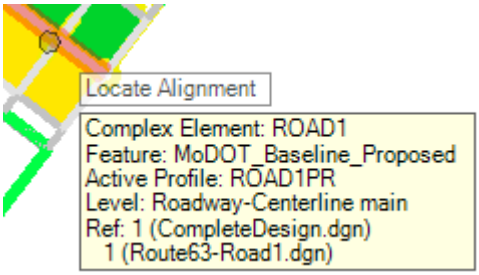
8. Close the *References* dialog.
9. MicroStation **Fit View** to pan to the project location.
10. With the *Element Selection* tool, **data point** on the Existing ground perimeter and set the Existing terrain model as the ***Active Terrain Model*** using the heads up display.



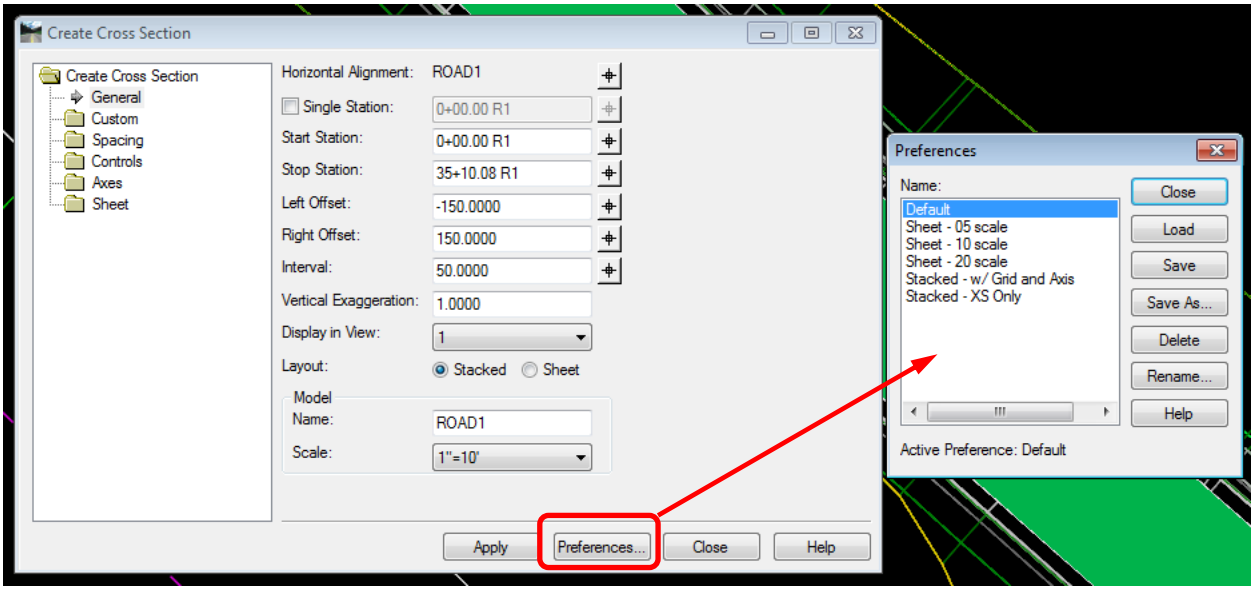

11. Window in to the Road1 corridor.

**Create the Cross Sections**

12. Continue in the same design file ***XS_J2P0200_Road1.dgn***.
13. From the *Corridor Modeling* tasks group, select the **Create Cross Sections** command 
14. When prompted to *Locate Alignment*, **data point** on the centerline of **Road1**.




15. Located at the bottom of the *Create Cross Section* dialog, select **Preferences**.

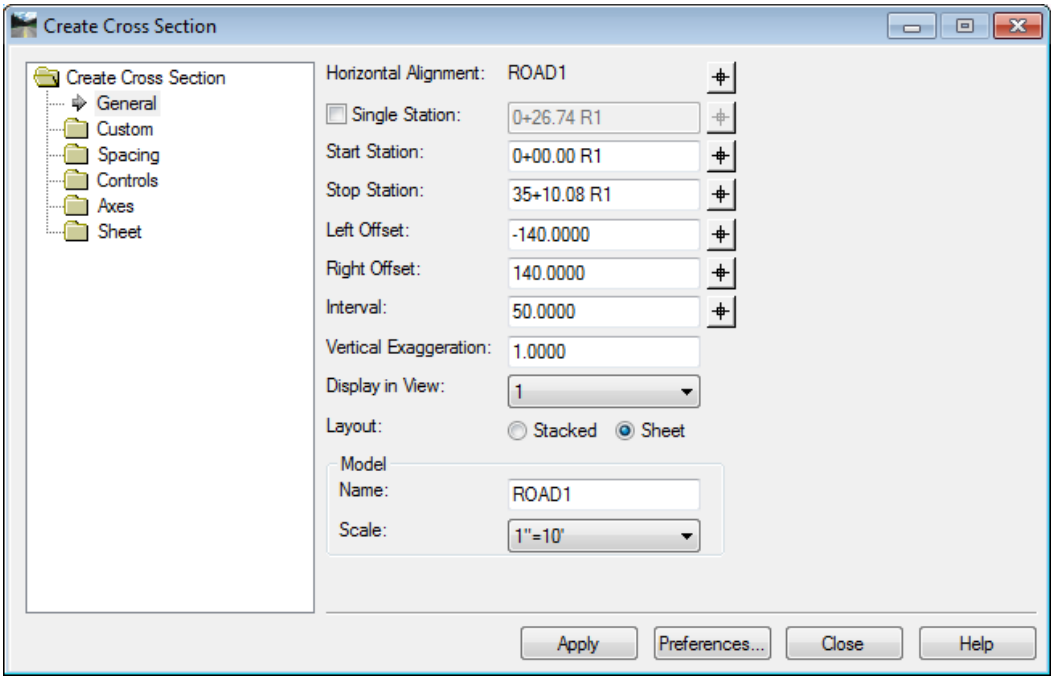



16. In the *Preferences* dialog select the preference titled **Sheet – 10 Scale**.
17. In the *Preferences* dialog, click **Load** to utilize the selected preferences in the previous step.

*Preferences are predefined settings stored in the active XIN settings file. These preferences will be used for creating, annotating and computing end area volumes on proposed cross sections.*

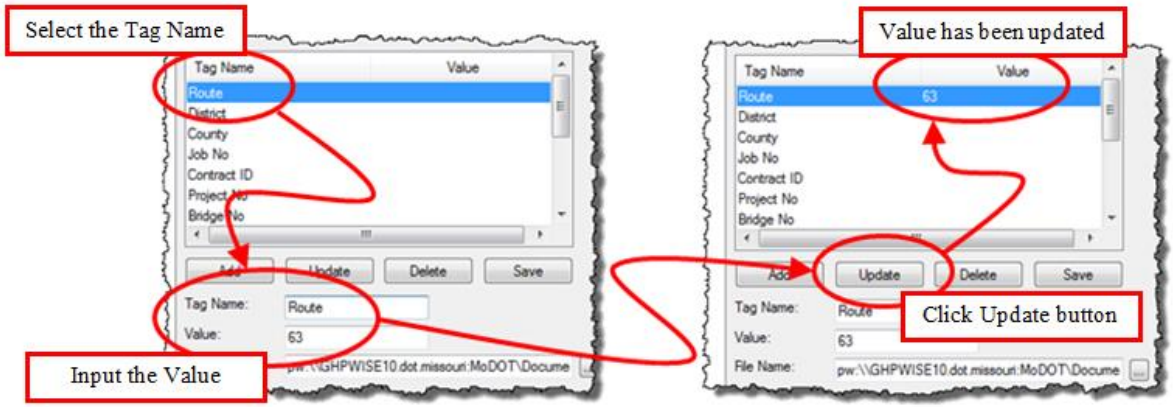
18. **Close** the *Preferences* selection dialog.

19. In the *Create Cross Section* dialog, complete the General settings as shown.




**Note:** Once the predefined Preferences are loaded, the ***General*** tab will default to the beginning and ending stations and will create perpendicular cross sections. In the event the project requires custom cross section locations, the ***Custom*** tab allows for a multitude of settings to accommodate many different scenarios.

20. Open the Sheet leaf (folder) and select the ***Annotation*** option. Change the Tag Values to include the following:




Route = ROAD1

District = NE

County = RANDOLPH

Job No. = J2P0200

Contract ID = (leave blank)

Project No. = (leave blank)

Bridge No. = (leave blank)

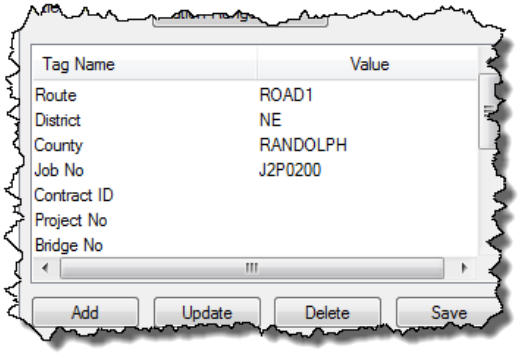
Info 1 = CROSS SECTION SHEETS

Info 2 = ROAD1 CONSTRUCTION

Sheet No. = (use default)

Total Sheets = (use default)

Sheet Of = (use default)




21. In the *Create Cross Section* dialog, click **Apply** to create the cross sections into a new DGN Drawing Model entitled ROAD1.

22. **Close** the *Create Cross Section* dialog after the cross sections have been generated.

Note: New cross sections will need to be created if edits are needed. This may be done in the Cross Section Model if the tool is still open but if the tool has been closed then you will need to open the Default Model.

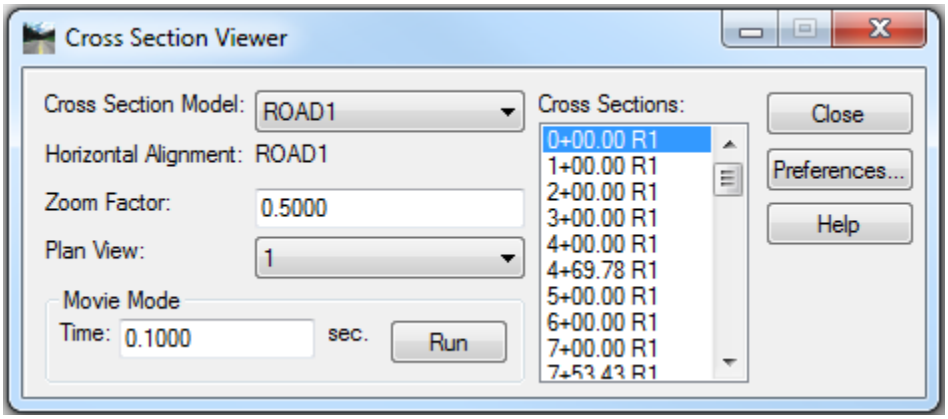
**View the Cross Sections**

23. Continue in the same design file *XS_Road1.dgn.*

24. From the *Corridor Modeling* task group, select the **Cross Section Viewer** tool**.** 

25. In the *Cross Section Viewer* dialog, verify the *Cross Section Model:* setting is set to your active Cross Section Drawing Model *Road1*.

26. Populate the *Cross Section Viewer* dialog as shown.




27. Select **Run** to automatically scan through the cross sections.

28. Now select any individual cross section station from the list and notice how the view updates to the selected cross section station value.

29. **Close** the *Cross Section Viewer* dialog.

**Annotate the Cross Sections**

30. Continue in the same design file *XS_Road1.dgn.*

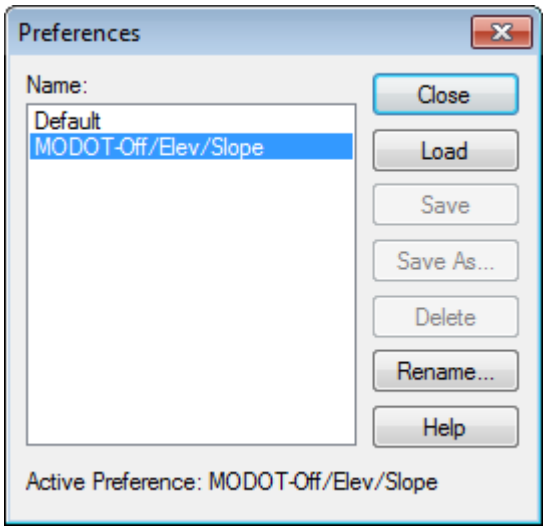
31. From the *Corridor Modeling* task group, select the **Annotate Cross Sections** tool. 

32. Located at the bottom of the *Annotate Cross Section* dialog, click **Preferences**.

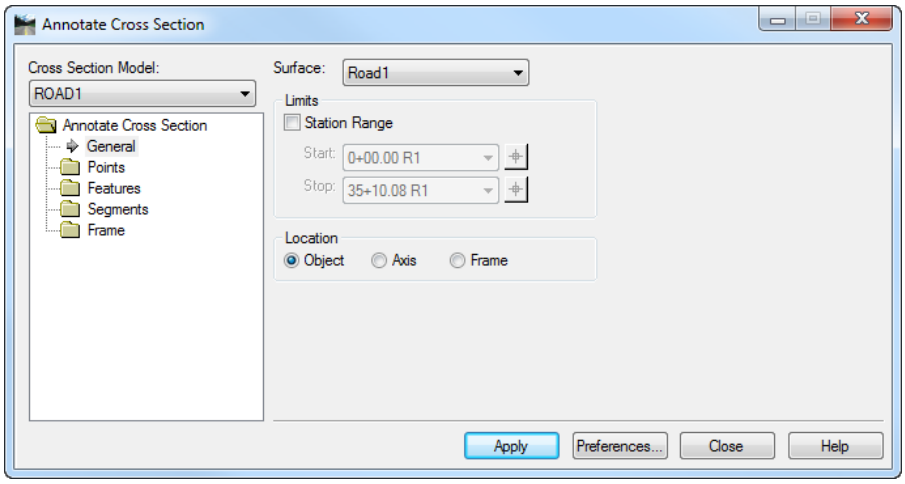
33. In the *Preferences* dialog, select the preference entitled **MODOT-Off/Elev/Slope**.

34. In the *Preferences* dialog click **Load**, to utilize the selected preferences in the previous step. Preferences are predefined settings stored in the active XIN settings file. These preferences will be used for creating, annotating and computing end area volumes on proposed cross sections.

35. **Close** the *Preferences* dialog.

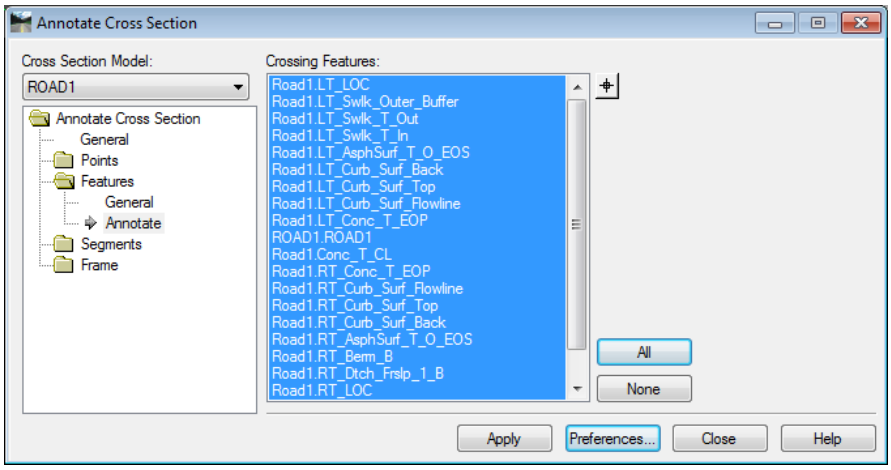


36. In the *Annotate Cross Section* dialog, complete the *General* settings as shown.




37. Expand the *Features* folder and select **Annotate** on the left hand side of the dialog.

38. Select all of the *Crossing Features* as shown below.




39. Expand the *Segments* folder and select **Annotate** on the left hand side of the dialog.

40. Select all of the *Crossing Features*.

41. In the *Annotate Cross Section* dialog, select **Apply** to annotate the cross sections in the selected DGN Drawing Model labeling offsets, elevations, and slopes. The cross section annotation labels are automatically made part of a MicroStation Graphic Group. Additionally, only the selected Features are labeled.

42. **Close** the *Annotate Cross Section* dialog.

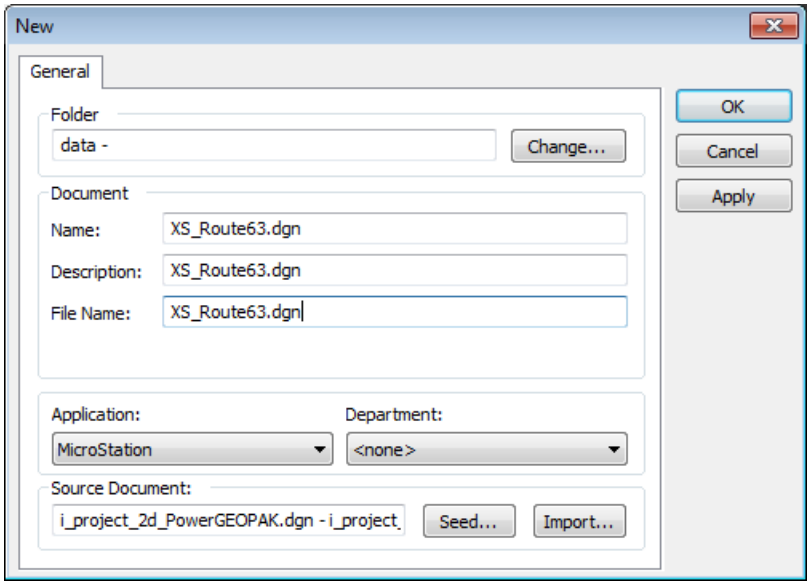
43. In the MicroStation tool bar select **Settings** > **Drawing Scale**. Change the setting from 1"=10' to 1"=20'. What happens to the text size? Return the setting back to the original setting of 1"=10' when complete.

## 9.8 Individual Exercise 5-1: Cutting Route 63 Cross Sections and Annotation

### Create a new Cross Section Design File

1. Select **File > New** and create a new MicroStation file named **XS_J2P0200_Route63.dgn**

   Using the seed file: *pw:\CADD_Standards\Seed Files\Design - English**i_project_2d_PowerGEOPAK.dgn***




2. Select **OK** to create the new dgn file.

### Attaching the Design as a Reference File

3. In the file **XS_J2P0200_Route63.dgn** created above.
4. Choose **File** > **References** in the MicroStation pull down menu or use the MicroStation icon  .
5. In the *References* dialog menu choose **Tools** > **Attach**.
6. Select the files in your current working directory;

   ***Terrain_J2P0200_Existing.dgn***

   ***Corridor_J2P0200.dgn***

   ***Civil_Geometry_J2P0200.dgn***

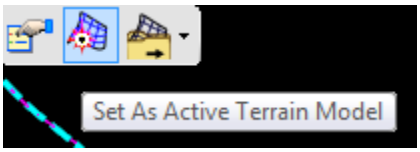
   ***Land_Boundaries_J2P0200.dgn***

   ***Superelevation_J2P0200 then*** click **OK**

7. Close the *References* dialog.

8. Use the MicroStation **Fit View** to pan to the project location.

9. With the *Element Selection* tool, **data point** on the Existing ground perimeter and set the Existing terrain model as the ***Active Terrain Model*** using the heads up display.




10. Window in towards the bottom of the project to see the area we will be identifying on the alignment.

**Create the Cross Sections**

11. Continue in the same design file *XS_Route63.dgn.*

12. From the *Corridor Modeling* tasks group, select **Create Cross Sections** command 

13. When prompted to *Locate Alignment* **data point** on the centerline of **Route 63**.

14. Select **Preferences** at the bottom of the *Create Cross Section* dialog.

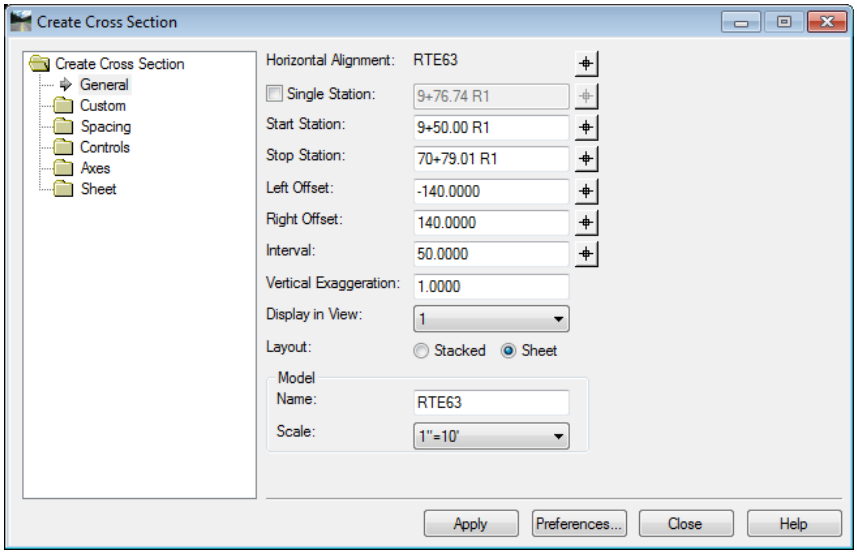
15. In the *Preferences* dialog, select the preference entitled **Sheet – 10 Scale**.

16. Click **Load** to utilize the selected preferences in the previous step.

    Preferences are predefined settings stored in the active XIN settings file. These preferences will be used for creating, annotating and computing end area volumes on proposed cross sections.

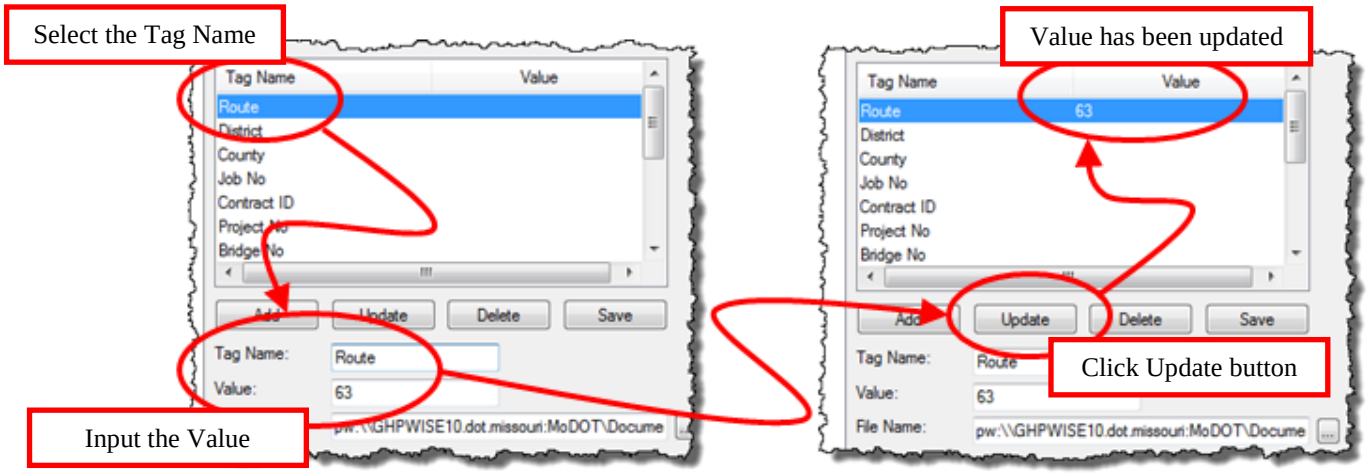
17. **Close** the *Preferences* dialog.

18. In the *Create Cross Section* dialog, complete the General settings as shown.



**Note:** Once the predefined Preferences are loaded, the ***General*** tab will default to the beginning and ending stations and will create perpendicular cross sections. In the event the project requires custom cross section locations, the ***Custom*** tab allows for a multitude of settings to accommodate many different scenarios.

19. Open the Sheet leaf (folder) and select the ***Annotation*** option. Change the Tag Values to include the following:




Route = RTE63

District = NE

County = RANDOLPH

Job No. = J2P0200

Contract ID = (leave blank)

Project No. = (leave blank)

Bridge No. = (leave blank)

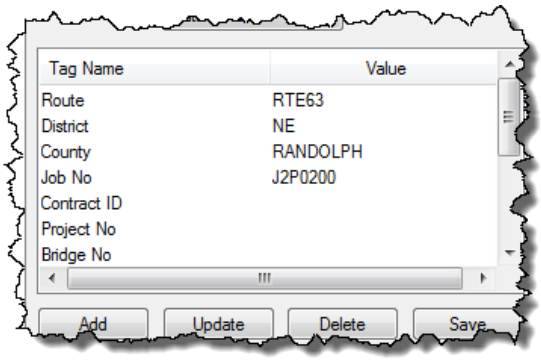
Info 1 = CROSS SECTION SHEETS

Info 2 = ROUTE 63 CONSTRUCTION

Sheet No. = (use default)

Total Sheets = (use default)

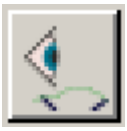
Sheet Of = (use default)



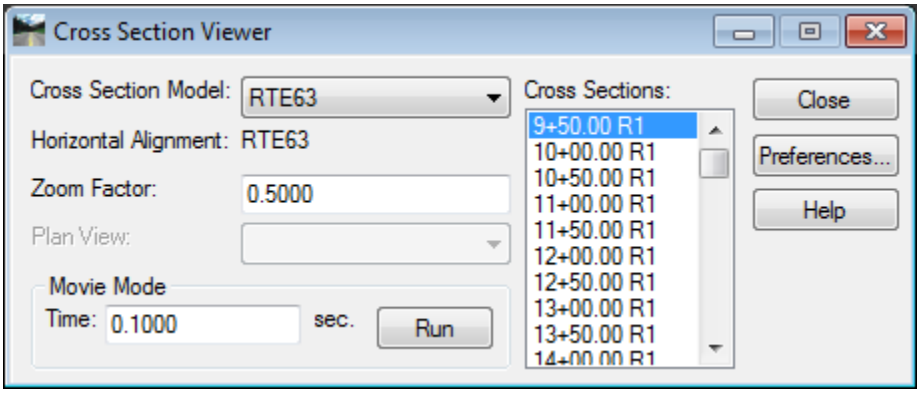

20. In the *Create Cross Section* dialog, click **Apply** to create the cross sections into a new DGN Drawing Model entitled ROUTE63.

21. **Close** the *Create Cross Section* dialog after the cross sections have been generated.

**View the Cross Sections**



22. Continue in the same design file *XS_Route63.dgn.*
23. From the *Corridor Modeling* task group, select the **Cross Section Viewer** tool**.**
24. In the *Cross Section Viewer* dialog, verify the *Cross Section Model:* setting is set to your active Cross Section Drawing Model *RTE63*.
25. Populate the *Cross Section Viewer* dialog as shown.

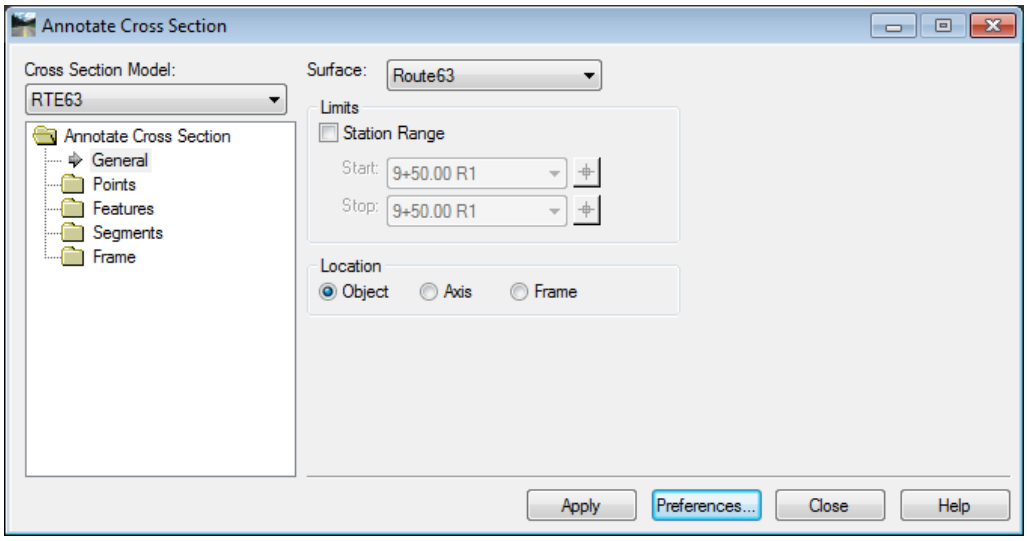



26. Select **Run** to automatically scan through the cross sections.
27. Now select any individual cross section station from the list and notice how the view updates to the selected cross section station value.
28. **Close** the *Cross Section Viewer* dialog.

**Annotate the Cross Sections**

29. Continue in the same design file **XS_Route63.dgn**.
30. From the *Corridor Modeling* task group, select the **Annotate Cross Sections** tool.
31. Located at the bottom of the *Annotate Cross Section* dialog, click **Preferences**.
32. In the *Preferences* dialog select the preference entitled **MODOT-Off/Elev/Slope**.
33. In the *Preferences* dialog select **Load**, to utilize the selected preferences in the previous step.
34. **Close** the *Preferences* dialog.

35. In the *Annotate Cross Section* dialog, complete the *General* settings as shown.




36. Expand the *Features* folder and select **Annotate** on the left hand side of the dialog.

37. Select all of the *Crossing Features*.

38. Expand the *Segments* folder and select **Annotate** on the left hand side of the dialog.

39. Select all the *Crossing Features*.

40. In the Annotate Cross Section dialog, click **Apply** to annotate the cross sections in the selected DGN Drawing Model labeling offsets, elevations, and slopes. The cross section annotation labels are automatically made part of a MicroStation Graphic Group. Additionally, only the selected Features are labeled.

41. **Close** the *Annotate Cross Section* dialog.

42. In the MicroStation tool bar select **Settings > Drawing Scale**. Change the setting from 1"=10' to 1"=20'. What happens to the text size? Return the setting back to the original setting of 1"=10' when complete.